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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCTOBER 17, 1942

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Old and New in Defense

See Page 248

A SCIENCE SERVICE PUBLICATION

Do You Know?

Sawdust has been used successfully by one Canadian motorist to fill a worn-out tire.

Courses in the *Chinese* language vie in popularity with Russian among British armed forces.

Australia is now self-sufficient in the production of *optical glass*, which used to be imported.

Potatoes, which contain vitamin C, prevented sailors from dying of scurvy in the days of long voyages on sailing ships.

This year's *lumber* production is expected to fall short of war and civilian requirements by some four to six billion board feet.

Five hundred thousand tons of new deposits of *bauxite*—the chief ore of aluminum — have recently been discovered in Georgia.

Century-old accumulations of *slate* around the quarries of Cornwall and Wales are being powdered and converted into camouflage paints.

The motion picture industry in occupied France is required to turn over all old *films* for the manufacture of Nazi chemical products.

All but one and one-half per cent of the *copper* mined in the United States comes from only 15 mines, and most of it from Arizona, Utah, and Montana.

Sugar cane sap is roughly 80% water, 16% pure sugar, and 4% molasses and impurities.

Ninety percent of the ingredients of an old *phonograph record* can be reclaimed to make new disks.

Shellac is produced by insects, practically all living in India, which transform the gum of trees into resin.

All motor vehicles in Estonia, Latvia, and Lithuania are required to use *wood gas* for fuel.

Canadians are experimenting with a new *fertilizer* made from the slag of steel furnaces.

To conserve *paper* in the United Kingdom, brewers are eliminating labels and using lettered crowns to identify bottles.

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Most articles which appear in* SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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AERONAUTICS

Plane Problem Complex

Controversy over whether American planes are superior is due to fact that some important features must be sacrificed to have others; fast planes are not maneuverable.

➤ ARE AMERICAN pilots being sent into the air in combat areas in planes that are inferior to the Japanese Zeros or the German Focke-Wulfs?

The answer is a vital one to the American people, and it is therefore the subject of hot controversy between writers who do not know the whole truth and public officials who are not at liberty to speak it.

When the facts are, finally, freely discussed, it will probably be perfectly clear that everyone is right and, to quote Gilbert and Sullivan, "all is right as right can be."

Here are the facts:

American airplane manufacturers can build the fastest planes in the blue.

They can make them climb.

They can make them maneuverable.

They can arm them with the best guns.

They can protect the pilot with the best in bullet proof windshields and fuselage.

They can make them relatively fire resistant by self-sealing fuel tanks.

They can make them carry a heavy load of guns, fuel, and bombs.

They can make them cruise farther with a fighting load than can the planes of any enemy — from Shangri La to Tokio.

But they can't combine all these features in any one plane.

If you build a plane that can outfly any other plane in the air, you can't expect to make it land on the space of a boat's deck.

If a plane is built that is so strongly fortified that it cannot be successfully opposed by any enemy fighter plane, you cannot expect extreme speed from it.

If a plane is built that will outdistance all pursuers, you can't expect that plane to "turn on a dime" and dart in and out of a dogfight like a mosquito.

And, all too often, a super-duper plane which combines an astounding number of these ideal features cannot be produced in large numbers in blitz time—it must be mulled over carefully by hand-workers.

Which of these features do we want in our planes? That is a question that is not yet completely answered. The chances are it never will be, because warfare in the air is constantly changing. And the enemy doesn't build his tactics to allow us the advantage of our strong points—he aims constantly at our weak points.

If we have an air armada of heavy, strongly fortified planes of the "invincible" type, the enemy will try to make all air battles a hit-and-run, dodge-and-harry type. If all we could supply to our pilots at the front were light, vulnerable planes without heavy armament but able to out-maneuver any opponent in a breath-taking display of sharp turns and loops and rolls, dog-fighting in aerial warfare would immediately become as obsolete as the dodo.

The argument as to the relative importance of speed, maneuverability, strength of armament, pilot protection, goes on and on and will continue. It is complicated by the fact that the pilot, too, has limits of what he can stand in maneuverability without "blacking out." The facts about the physiology of pilots, like those on the engineering performance of planes, is not being told lest it aid the enemy. Enemy pilots are subject to the same human failings when exposed to high altitudes, extreme cold, fast turns and abrupt dives. They would like to know what we know.

Some pilots lean to the opinion that the immediate practical answer to the question is this: We need planes—period. We need fast planes. We need maneuverable planes. We need quick-climbing planes. We need heavily armed planes. We need long-cruising planes. We need all sorts of planes. But, above all, we need planes—in quantity and immediately.

Science News Letter, October 17, 1942

ARCHAEOLOGY

New Find Helps Date Prehistoric American

➤ A NEW discovery, which may lead to more complete knowledge of our protohistoric North American ancestors and help bridge the 10,000-year gap in archaeological knowledge, has been made by Dr. Frank H. H. Roberts, Jr., Smithsonian Institution archaeologist.

PITCHING INTO THE SCRAP—These are steel shavings thrown off in making propellers for U. S. warplanes at the Curtiss-Wright Corporation's propeller plants in New Jersey. The shavings are being pitched onto a truck for shipment to a plant for re-claiming—and that isn't hay.

A bison wallow, two or three thousand years old, was excavated in eastern Wyoming by Dr. Roberts. It revealed a number of spear points known as "Yuma points," formerly thought to date back to the oldest known inhabitant of North America, the Folsom man who lived at the end of the last Ice Age, 10,000 to 20,000 years ago.

This new discovery, however, places the Yuma points at a much later date, somewhere between Folsom and modern. It may lead to more complete knowledge of the "Yuma man" who used those spear points and thus fill in the gap in archaeological data between the Ice Age and the dawn of history on the North American continent.

Science News Letter, October 17, 1942

MEDICINE

Anti-Blood Clot Chemical Successful in Sweden

➤ A COUMARIN compound from spoiled sweet clover, called AP, has been successfully used in patients suffering with thrombosis of the legs, it is reported by Dr. Jörgen Lehmann, of Sahlgrenska Sjukhuset Central-Laboratorium, Göteborg, Sweden (*Science*, Oct. 9).

As the clotting tendency of the blood was reduced, as shown by blood tests, there was improvement in the patient's condition as shown by a fall in temperature and lessening of swelling and congestion. Patients with milk leg were more resistant to the drug and required larger doses than those with other types of thrombosis of the legs. In all cases the course of the disease was shortened and no further blood clots developed.

AP should not be given to patients with kidney, heart and liver disease, Dr. Lehmann warns. Mild toxic symptoms, such as vomiting and diarrhea, occurred in a few cases after the first dose of the drug but seldom after subsequent doses. Liver and kidneys were not affected. Minor hemorrhages occured in two of the 17 patients but were controlled by one of the vitamin K compounds. Two expectant mothers were successfully treated for thrombophlebitis. Nursing mothers excrete AP in their milk, tests of their babies' blood showed.

The drug can be given, Dr. Lehmann states, with the sulfa drugs, the barbiturates and morphine. It can be given to patients with tuberculosis and pneumonia.

Science News Letter, October 17, 1942

MEDICINE

Protein Study Made

➤ IF YOU are hungry for a steak, be glad you don't have to read an editorial, appearing in the *Journal of the American Medical Association* (Oct. 10) which includes such mouth-watering details as sitting down three times a day to eat twelve and one-half pounds of meat.

Dogs ate the meat — in pre-meatless days—during studies on protein deficiency. The studies were made by Dr. L. A. Sachar, Dr. Abraham Horvitz and Dr. Robert Elman, of Washington University School of Medicine and Barnes Hospital, St. Louis, and reported in the *Journal of Experimental Medicine*.

Protein deficiency in the body resulting from protein-poor diets, can be detected and measured simply by determining the amount of albumen in the blood serum, the St. Louis scientists discovered. Their findings and those of other scientists on dogs indicate that there is a constant relationship in the loss or gain between blood plasma or serum albumen and total body protein induced by diet.

From this they developed a formula, believed applicable to man as well as the dog, which will show the doctor how much protein must be given to a patient in order to replenish the depleted body protein. In one of the studies dogs that had been on protein-deficient diets were given meat *ad libitum* to see how fast they could overcome the depletion. Each dog ate daily for two weeks about one-fourth of its body weight in meat, which would be equivalent to twelve and one-half pounds of beefsteak three times a day for the average grown person.

For patients who are severely depleted and must be fed through their veins, the St. Louis scientists believe that human serum or plasma transfusion is unpractical. They suggest instead the use of hydrolyzed proteins of "high biologic value."

The studies and findings should not be taken to mean that plasma or serum transfusions are without value in other conditions. The protein deficiency studied, moreover, is a severe one resulting from a much more limited diet than one with a two pounds per person per week meat allowance.

Science News Letter, October 17, 1942

MEDICINE

Winged Shoulder Blade

➤ DISCOVERY of what is apparently the first case on record of winged shoulder blade resulting from carrying a knapsack is reported by Captain F. W. Ilfeld, M. C., U. S. Army, and Major Hall G. Holder, M. C., U. S. Army (*Journal, American Medical Association*, Oct 10).

The patient, a private, was admitted to the Station Hospital at Camp Callan, Calif., complaining of difficulty in raising his right arm and a prominent right shoulder blade which seemed to "strike the back of the chair" when he sat down.

He thought the condition was due to having "strained" his right shoulder while putting the pack on his back. The doctors found a weakness of the muscle that rotates the shoulder blade and with no other cause that could be found for it, ascribed the condition to "stretching of the long thoracic (chest) nerve in swinging the pack on the back or to pressure on the long thoracic nerve from the strap of the knapsack against the chest and shoulder."

The patient's arm was supported in a sling and he was given infra-red heat treatment and massage to the shoulder. Slight improvement in muscle power followed within a week and about four weeks later his shoulder blade and its muscle were back to normal.

"In view of the expansion of our armed forces during the present emergency," the Army surgeons declare, "the occurrence of this deformity from such cause, its recognition and treatment are important."

The winged shoulder blade deformity has been reported as long ago as 1825 but the causes of earlier cases have ranged from infantile paralysis and other diseases to injuries from being kicked by a horse, using crutches, and the like.

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MEDICINE

War Pneumonia Not New

Disease may be 1942 alias for bronchopneumonia of grandpa's time. Virus pneumonias were reported before the war. Pneumonias due to variety of causative agents.

➤ WHEN YOU hear or read stories about "a peculiar wartime pneumonia," don't get frightened or think they signal another disease disaster like the influenza epidemic of the last World War.

"Wartime pneumonia" may be and in many cases probably is an alias for the bronchopneumonia familiar to grandpa and his family doctor. Pneumonia has gotten a lot of new names in the last 10 years, but the sickness is not new, and even the new names are older than the present war.

Until about 10 years ago there were two kinds of pneumonia appearing on hospital records and death certificates: lobar pneumonia and bronchopneumonia. Lobar pneumonia starts suddenly with chill, cough, pain in the chest or side and rusty sputum. It is caused by round micro-organisms called pneumococci. Before the discovery of the sulfa drugs, it was treated with specific antiserum, a special serum for each type of pneumococcus.

In bronchopneumonia the sickness did not always come on suddenly with chill, pain, cough and rusty sputum. It generally started more gradually, like a cold or bronchitis, which got worse. No typical pneumococcus was found to be causing the sickness and antiserum did no good. Doctors used to think bronchopneumonia was due to secondary germ invaders of the lungs, such as streptococci and staphylococci.

Long before this present war started, the diagnosis of bronchopneumonia began disappearing from hospital records, and diagnoses of atypical pneumonia, pneumonitis, virus pneumonia and the like began appearing. French and German doctors nine years ago began reporting these new kinds of pneumonia. As early as 1935 an American Army X-ray specialist reported finding among troops in Honolulu cases of what he called acute influenzal pneumonitis. The words pneumonitis and pneumonia both mean inflammation of the lungs.

The following year came an American report of what seemed to be bronchopneumonia which was claimed to be due to a virus. In the next few years two groups of American scientists each found a different virus in cases of pneumonia.

Viruses are such small germs they cannot be seen even with ordinary high-powered microscopes and can pass through the pores of filters that stop larger germs such as the pneumococci. Closely related to viruses are a group of germs called rickettsia which pass through filters like viruses but which are large enough to be seen under microscopes.

A rickettsia is the cause of a kind of pneumonia discovered in Australia in 1937. The Australians call it "Q" fever and in 1940 cases of "Q" fever were also discovered in the United States.

"Q" fever, like the atypical or virus pneumonias so much discussed these days, is a mild disease that might be called influenza, rather than pneumonia, unless the patient's chest is X-rayed. Patients seldom die of either "Q" fever or the atypical pneumonias reported nowadays. You remember that bronchopneumonia was not very often fatal either except in elderly people.

Medical opinion these days is that some cases of pneumonia may be due to rickettsia, the "Q" fever germ; that some may be due to two other identified viruses; that some may be due to the virus causing psittacosis or parrot fever; and that bacteria such as staphylococci or streptococci and possibly other still unidentified viruses probably cause the rest of the pneumonias that are not pneumococcal pneumonia.

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ENGINEERING

Girl Computer Has Made Specialty of Light Curves

➤ CURVES—isocandle and isolux—are the speciality of Miss Ruth Forbes. She is the only woman in the United States computing these lines for the use of electrical engineers.

They are similar to the lines on weather elements; only these lines show

CURVES, isocandle and isolux, are being computed by Miss Ruth Forbes of General Electric. In the background are charts showing the lines which indicate distribution of candle power from a light unit.

the distribution of candle power from a light unit.

Miss Forbes started to work for the General Electric Illuminating Laboratory two years ago. Although she was not a high school graduate, she worked into a job usually done by an electrical engineer.

Out on the testing range, a big, gloomy barn of a place, it is all in the day's work to analyze a huge Army billion-candlepower searchlight, then turn around and measure the light from a cigarette. With a "knack for math," Miss Forbes proceeded to find out how and why.

Now she knows how to make some 800 photometer readings. From these she computes, by slide rule and calculator, the curves showing the light distribution obtained by testing a unit.

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CHEMISTRY

Electroplating Surprise

Attempt to produce nickel powder results in coating on only one side of sheet; may have commercial use. Electrochemical Society hears of other advances.

➤ IN ATTEMPTING to produce nickel powder by rapidly electroplating the metal on a copper sheet, Dr. Oliver P. Watts, professor of electrochemistry at the University of Wisconsin, ran upon a strange phenomenon which he reported to the Electrochemical Society meeting in Detroit.

A coating of nickel appeared on the back of the copper but none on the front. This, he said, was contrary to all recorded experience with plating solutions. Furthermore, no nickel powder was produced.

Dr. Watts had tried to utilize that "bugbear" of the plater, the "burned" deposit, by passing a very large current of electricity through a dilute solution of nickel sulphate. This should have done the trick, because too heavy a current produces a crumbly deposit which frequently drops off.

To increase the conductivity of the solution and thereby increase the current, Dr. Watts had added a large amount of sodium sulphate to the solution and also heated it. Such "conducting salts" are frequently used. To his surprise he got only a film of alkali on the front of the plate but a good adhering coat of nickel on the back. Measurements showed that three-quarters of the current had been employed in depositing the alkali and only a quarter in depositing the nickel. The latter part of the current had to pass around the edges of the plate to reach the back. Usually in electroplating the front of an object is more heavily plated than the back.

Other metals and other solutions were tried and it was found that the same thing could be done with cobalt and iron, but not as yet with tin, zinc or copper.

As a possible commercial use of this curious phenomenon, Dr. Watts suggests that the solution might be so regulated as to plate front and back equally, but so far he has been unable to get any happy medium between a thicker coat on the front or none at all on the front.

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Better Nickel Plating

Thick and extra hard coatings of nickel can be formed by adding ammonium salts to the plating bath, and properly proportioning the other ingredients, Dr. W. A. Wesley, assistant director, and E. J. Roehl, research chemist, of the Research Laboratory of the International Nickel Company of Bayonne, N. J., told the Electrochemical Society.

Many new problems arising in defense activities, the investigators said, involve surfacing of parts to resist wear and corrosion, and the salvaging of worn and mismachined parts, by the electrodeposition of heavy metal layers. The coatings must be hard, have strength, ductility, machinability, adhere strongly, and have a heat expansion close to that of steel. Furthermore, the deposits must not be in layers such as the old "hard baths" gave, but must be homogeneous.

By researches in the laboratory and on a pilot scale, these two chemists have produced and thoroughly tested new hard baths that give coatings conforming closely to all the desired qualities.

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Urge Science "Scrap" Drive

➤ A NEW kind of "scrap" drive to discover, collect and use the "hidden treasure" of scientific discoveries laid aside and forgotten in laboratories, libraries and old reports and records, was urged by Dr. C. F. Burgess, of Chicago, pioneer in electrochemistry, in his address at Chicago accepting the Electrochemical Society's Edward Goodrich Acheson medal and $1,000 prize.

Stressing the great progress being made by technology under the stress of war, Dr. Burgess said:

"The necessarily slow processes of science cannot compare in importance with the urgent, unromantic patriotic duty of all citizens in collecting scrap, not only that which lies on the surface, but more especially the hidden treasures in libraries, old reports and records—discoveries laid aside and forgotten.

"In this search," Dr. Burgess added, "scientists and the vast number of amateur workers can join forces and turn drudgery into romance in discoveries of value."

The electrochemical industry, an infant at the opening of the century, Dr. Burgess said has become such a powerful giant that it has been commandeered as a major agency in war. He predicted that remarkable developments under way will push upward the standards of life when peace arrives.

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Heat Affects Battery

➤ THE AUTOMOBILE storage battery loses its charge on standing three times as rapidly at 100 degrees as at 70 degrees Fahrenheit, but at 32 degrees the loss is vanishingly small. These are results of tests carried out by A. C. Zachlin of the Development Laboratory of the Willard Storage Battery Co., and reported to the Electrochemical Society meeting in Detroit.

Around 70 degrees, the usual automobile battery loses on standing about 1% of its charge per day, Mr. Zachlin said, so that at this rate it would in three months become practically discharged. The moral evidently is, if you have to store your car, store it in a cool place, preferably where the temperature is kept only slightly above freezing.

If the plates of a battery are made of pure lead, Mr. Zachlin pointed out, the loss on standing is reduced to practically

nothing—to less than 15% per year. But pure lead is too soft for automobile batteries and it is customary to use lead containing 6% to 12% antimony. It is this antimony, he indicated, which is responsible for the discharge on standing.

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PSYCHIATRY

Nerves Must "Take It"

British sailors who have case of "nerves" get no sympathy. Odd treatment prescribed. Other problems of Navy medicine are discussed.

➤ SAILORS in the British Navy who develop "nerves" from the strain of living and carrying out their duties in constant danger get no sympathy. Medical officers are told instead to be "hard but understanding" in treating such cases, Real Admiral Wilfred R. Patterson, chief of staff of the British Admiralty Delegation, told members of the Medical Society of the District of Columbia at their annual meeting.

Too much coddling has been found bad for such cases. Frequently the treatment consists in putting the man into conditions even more intolerable than those he complained about. A man might, for example, be told to stay in his hammock without smoking or drinking anything but water. A short time of such treatment proves so boring that the man is usually ready to return to the duties formerly considered intolerable.

The strain of sea duty under present conditions of warfare, in which the danger from submarines, bombers and torpedo planes lasts from dawn to after dusk every day and does not stop even when the ship is in harbor, is so great, however, that one year at a time is enough for those in responsible positions, in the opinion of Admiral Sir Andrew Cunningham whom Admiral Patterson represented at the meeting.

In recognition of this, the British Navy has houseboats on the Nile and hospitals on the sands at Alexandria for the men of the Mediterranean fleet to rest and recuperate from the psychological strain.

Men of good character and sober habits, contrary perhaps to general expectation, make better fighters and stand the strain of service on fighting ships better than the "tough guys who are always breaking up the pubs," Admiral Patterson said. Even the steadiest and best of the men, however, suffer reactions to the strain and overfatigue after a time. This shows up in inability to sleep, among other symptoms.

Barnacles that grow on the sides of ships in tropical waters are a serious danger against which Admiral Patterson warned the American doctors who might have to handle patients from ships that go down. The sides of the ships are likely to be very slippery with oil so that men escaping from a sinking or overturned ship slide down very fast and are often badly injured by the barnacles.

In supplying life boats, water should predominate over food, he cautioned. Man can live 30 days without food but only five days without water, he pointed out. Biscuits and chocolates, frequently the chief food supplies for life boats, are both "well known thirst producers."

Men who are shipwrecked and must spend days in a life boat or raft should know in advance such practical matters as the advisability of cutting a piece off the bottom of a trouser leg to wrap around their heads for protection against the sun. They should also be prepared to overcome at once any aversion to using dead men's clothing for their own protection.

Experience with flash burns in this war has taught the need for wearing at all times overalls, helmets and even gloves, in spite of the discomfort in tropical weather.

Night blindness was at one time a problem on submarines, Admiral Patterson reported. Officers found that when they came up at night it took as long as nine minutes for them to be able to adapt their eyes to seeing in the dark —"a chancy business," he commented dryly. This problem has been overcome chiefly by improved diet for submarine officers and crew. The daily food for each man on a submarine now costs about 75 cents, while that for an ordinary sailor costs only 25 cents.

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CUTE EYE TEST—This little girl is having her vision tested on a new chart for children just announced by the American Optical Company. Mary was asked to recognize the animals and tell which way the E prongs point.

INVENTION

Simultaneous Neutron and X-Ray Pictures Now Made

➤ SIMULTANEOUS examination of an object by neutrons and by X-rays is provided by the invention of Hartmut Israel Kallmann, formerly known as Hartmut Kallmann, of Berlin-Charlottenburg, and Ernst Kuhn of Berlin, Germany. They have received U. S. patent 2,297,416, which is vested in the Alien Property Custodian.

These inventors have taken out two previous patents on neutron pictures.

Since the information given by neutrons, uncharged atomic particles, is different from that given by X-rays, the inventors say that it is desirable to examine an object in both ways, and that the radiation come in each case from the same direction. Their device makes it possible to use the two methods in quick succession or simultaneously. In the latter case, the X-ray image is received on photographic material sensitive to these rays but not to neutrons. This is backed by a layer that stops the X-rays but not the neutrons, which latter are photographed on a second film.

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INVENTION

Flying Wing in New Form Adapted to Small Planes

➤ A NEW version of the flying wing, one that is adapted to a smaller plane than the Northrop type, patented earlier, is the invention of David R. Davis of Los Angeles (U. S. Patent 2,298,040). The rights have been assigned to the Manta Aircraft Corporation of Los Angeles, Calif.

In order to get room inside the wing of a small plane for the pilot, and engine and other things, the wing must be very wide at least in its middle portion, but from there may taper sharply to the tips. This gives a V shape to the front of the wing, the point of the V, which may carry a single engine, projecting quite far forward. The rear is also V shaped but much flatter.

This gives to the whole wing a shape like a fore-shortened kite, but it sails with the sharp end forward instead of the blunt end. A tail assembly completes the plane.

This shape has been tried before, Mr. Davis states, but proved unstable because of poor aerodynamical action at the wing tips. This he remedies by curving the front edges slightly forward as they approach the tips, and by rounding the latter. This gives them a better grip on the air and renders the plane stable. They also improve the aerodynamical performance of the whole wing, he says, and increase the lift.

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ENGINEERING

Expander Type Rings Give Longer Service

➤ MOTORS and trucks now doing essential service on our highways can be operated a longer time without reconditioning by the use of expander type piston rings, P. E. Friend of the Wilkening Mfg. Co., told the Society of Automotive Engineers meeting in New York.

Plain non-expander piston rings, Mr. Friend said, work all right so long as the cylinder is round and straight. But so soon as it is worn a little more in some spots than in others—is no longer truly circular or straight up and down—the ordinary ring fails in its function because it rides over the irregularities.

The expander type, he explained, is more flexible and has inner springs which exert independent pressure against every part of the cylinder, so that the ring conforms to the variations in the contour of the cylinder wall. Consequently a worn cylinder can be used much longer, and because of the flexibility of the ring, there is less wear in the first place.

At least six engine manufacturers, he said, are supplying these rings as original equipment, and many others buy them and stock them for replacement service.

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MILITARY SCIENCE

Schooner and Plane Join In Combating Submarines

See Front Cover

➤ THE United States Coast Guard now has fleets of sailing schooners coordinating their vigilance with Coast Guard patrol planes and fast cutters to rid our waters of lurking submarines.

Like privateers of the old days, these sleek schooners glide along the shipping lanes smoothly and silently, equipped with the latest devices for detecting hiding enemy submarines. They are playing a major part in the battle of the shipping lanes, Coast Guardsmen report.

Science News Letter, October 17, 1942

INVENTION

New Bomb Sight Invented; Two Telescopes Are Used

➤ A NEW bomb sight (patent 2,297,132) has been invented by Romeo A. Bossi of Newton Center, Mass.

Its use depends on mechanically calculating the effect of two main factors that govern the aim, height and speed of the plane when the latter is flying directly toward the target.

Two telescopes are employed fastened together like a pair of binoculars. One is the regular sighting telescope, the other a reading telescope which is directed toward a sheet of graduated scales. The bombardier directs the latter to the point on the sheet corresponding to the given height and speed, and of course the other telescope turns with it. When the target comes into the field of the sighting telescope, he releases the bomb.

It may be pointed out that height and speed are not the only factors that affect the aim. This is only the first step to accuracy.

Science News Letter, October 17, 1942

IN SCIENCE

INVENTION

Electron Whirler Patented; Improve First Models

➤ DR. DONALD W. KERST of Scotia, N. Y., inventor of the doughnut-shaped electron accelerator which whirls electrons up to an energy of 20,000,000 volts, which has been much in the news, has now received U. S. patent 2,297,305 for his invention. The rights have been assigned to the General Electric Company. This company, as announced in the news, is now building a 100,000,000-volt machine of the same sort.

Dr. Kerst claims only improvements over previous attempts to whirl electrons between the poles of a magnet, which attempts, he says, either failed or succeeded only in an extremely limited sense.

The improvements consist mainly in a means of introducing the electrons in such a manner that they will be more surely captured by the magnetic field, and of regulating this field in such a way that the electrons will be held in their courses for hundreds of thousands of revolutions and so build up a high electron energy.

Science News Letter, October 17, 1942

PHYSICS

Wool Warmth Depends On Weight and Weave

➤ WARMTH of woolen and partly woolen fabrics depends more on weight and weave than on the proportion of wool in the fabric. This was brought out in tests made by the Manville Jenks Corp. and reported by its president, K. B. Cook, in Textile World. The fabrics tested contained from 100 per cent down to 8 per cent wool, the rest being cotton and rayon. Those of the same weight and weave showed about the same insulating power. After five dry cleanings, the warmth of the fabrics increased somewhat, but this was attributed to shrinkage. Another curious result was that a wind as low as six miles per hour can almost double the heat loss through a fabric.

Science News Letter, October 17, 1942

NE FIELDS

NUTRITION

Japs Use Surplus Silk To Improve Their Diet

➤ EVER wondered what the Japs are doing with all the silk we used to import?

Well, according to a Department of Commerce report, they are eating it.

Of course they're not lunching on chiffon hose and satin yard goods. They are extracting honorable Vitamin B from honorable silkworm cocoon, to make admirable diet.

While nutritionists could not be reached for comment, it is believed the new diet of worms will make a tasty addition to rice and dried fish.

Science News Letter, October 17, 1942

ENGINEERING

Navy Men Win Top Awards In Lincoln Welding Study

➤ TWO MEMBERS of the U. S. Navy Department won the $13,700 top award of the "$200,000 Industrial Progress Award Program," sponsored by James F. Lincoln Arc Welding Foundation of Cleveland. They are Captain C. A. Trexel and A. Amirikian, director of planning and design, and design engineer, respectively, of the Navy's Bureau of Yards and Docks.

Their paper described the construction of arc welded caissons or gates for naval dry docks and showed how this method has saved the government $1,652,000 on work already done or under contract. Further savings in the same kind of work, they estimated, will amount to $3,540,000, will save 9,000 tons of steel, and the work can be done in one-third less time. The steel saved will permit the caissons to be armor-plated for bomb protection, with no more total steel than unprotected structures.

In all, 408 awards were made to 458 recipients, the difference covering joint authorship. The combined results of all the papers, said Dr. E. E. Dreese, Chairman of the Foundation and of the Jury of Award, showed a possible annual saving of $1,825,000,000, including 7,000,000 tons of steel and 153,000,000 man hours of labor, by the use of arc welding. It was also pointed out that the use of arc welding has increased 20-fold during the past ten years.

The saving of metal in welding is due to the fact that plates can be joined edge to edge instead of overlapping or with the use of cover plates as in riveting.

Science News Letter, October 17, 1942

CHEMISTRY

Reclaiming Process for Rubber Is Improved

➤ U. S. patent for the more rapid reclaiming of old rubber has been secured by Henry Ghez and Oscar Ghez of Paris and they have assigned their rights to a corporation in Panama. Instead of pressure cooking the scrap with steam or hot gases at high pressure, they cook it in an open vat in a bituminous liquid of high boiling point. This is quicker, they say, and more effectively conveys heat to the rubber. Also, when the scrap is lifted from the bath and allowed to drain, the material forms a film which protects the rubber from oxidation while on its way to the milling operations.

Science News Letter, October 17, 1942

PHYSIOLOGY

Test for Blood Volume Based on Radiophosphorus

➤ A NEW, simple test for determining the amount of blood in the entire body from the radioactivity of a few drops (two cubic centimeters) of blood is reported by Dr. Frank A. Brown, Jr., Dr. L. H. Hempelmann, Jr., and Dr. Robert Elman, of Washington University (*Science*, Oct. 2).

The procedure, as reported for dogs, is to inject radiophosphorus into a dog's veins. After a few days the red blood cells become so radioactive that they can be diluted 100 times and yet have sufficient radioactivity for accurate measurement in a Geiger counter.

The red cells from about two and one-half teaspoons of this radioactive blood are suspended in salt water and injected into the dog whose blood volume is to be measured. After allowing enough time for these cells to be mixed with the dog's own blood, two cubic centimeters are removed and the radioactivity of this sample measured with the Geiger counter and compared with that of the sample of radioactive blood injected. Simple division gives volume.

Science News Letter, October 17, 1942

RESOURCES

Restrictions Put on Wool For Paralysis Patients

➤ ANNOUNCEMENT that the National Foundation for Infantile Paralysis had 100% wool available for patients getting the Kenny treatment resulted in a deluge of requests to headquarters. Consequently the Foundation now announces that the wool can only be shipped to hospitals where the need is immediate, that is, where patients in the early stages of infantile paralysis are actually under treatment when the request is made.

The material, available through the cooperation of the National Paperboard Association, cannot be shipped in anticipation of cases that may occur in the future. In communities where there are only one or two cases, it is suggested that sufficient material, such as old blankets, lightweight woolen suiting and the like, can be obtained without calling on the Foundation's supply.

An average of five pounds of woolen material is required for each patient. Those requesting it from the Foundation are asked to order only as much as is needed.

"If the foregoing is adhered to, we believe we will be able to meet the demands of the entire country," the Foundation states.

The woolen material is cut into pieces used for hot fomentations over the affected areas, an important feature of the Kenny treatment of infantile paralysis.

Science News Letter, October 17, 1942

ZOOLOGY

Jelly-Fish Are 96% Water Says Report from England

➤ HOW MUCH water there is in a jelly-fish is the subject of discussion in England even during war time.

Dr. A. G. Lowndes, at the Plymouth Biological Laboratory, has determined that jelly-fish in the ocean near Plymouth are composed of about 96% water, 3% salts and a trace of fat. The amount of protein, 0.67%, indicates that the animal has only about 4% protoplasm, the stuff of life.

Text books have long told that jelly-fish contain 99.8% water, but while they are very liquid, their water content is not as high as that. Most marine animals contain about 80% water and 15% protein.

Science News Letter, October 17, 1942

GENERAL SCIENCE

Soviet War Science

Russian scientists mobilize. New methods produce vital supplies far to north and east of battle area. Exploration develops resources. Ask information exchange.

By PROF. K. I. LUKASHEV

Deputy Chairman of the Soviet Purchasing Commission, geologist and former president of Leningrad University

➤ THE HEROIC achievements of the whole Soviet people in stemming the Nazi tide have been enormously aided by the part played by science in the U. S. S. R. At the outbreak of war, Soviet scientists were mobilized, ready to use against the attacker every technical and theoretical weapon at their command.

This total mobilization of science has made possible the incredibly swift and complete preparations for carrying on vital war industries behind the Ural mountains. Whole industries have been moved east, new centers built, new sources of raw materials opened, existing possibilities expanded in the shortest possible time. Even before the war, new industrial centers were planned to provide maximum safety from attack, in East and West Siberia, on the steppes of Kazakhstan, among the Altai mountains and in the semi-tropical regions of vast Asia.

Three principles have guided the planning of Soviet industrial centers. First, to place them close to the sources of raw materials; second, to place them far away from possible Nazi attack, thus also insuring the desirable opening up of "backward" regions; and third, to use all possible technological and scientific knowledge, so that industrial problems would be closely integrated with those of agriculture.

A special committee of scientists, headed by academician Komarov, has been working on the numerous problems connected with the rapid increase of steel production in the Urals and the necessity of supplying this rapidly growing industry with a continuous flow of adequate raw materials.

New iron deposits have been discovered and local coal mines have been opened up, mostly of the open-cut type, providing greater supplies of coal and iron near at hand and relieving the railroads, which formerly had to haul coal to the blast furnaces of the Urals from the Kuznetsk and Karaganda mines, a distance of over 2,000 miles.

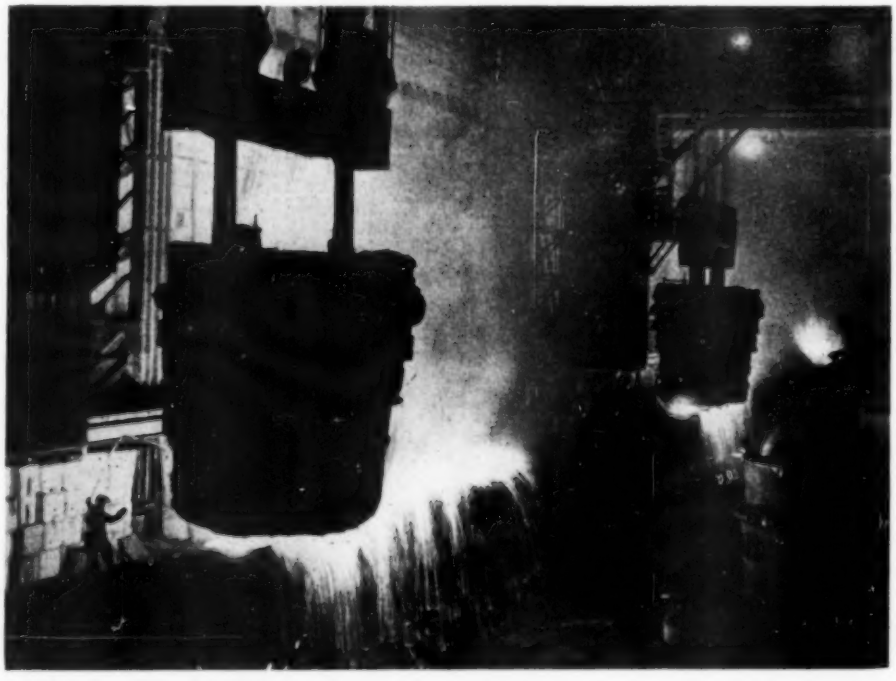
Another problem solved by the scientists for the Urals steel industry was the development of improved methods, making possible the employment of low-grade Siberian manganese ores for the production of ferro-manganese.

A group of scientists of the staff of the Urals branch of the Academy of Sciences of the U. S. S. R., in collaboration with the management and workers of a local plant, have perfected a new method for the production of ferrochrome in large quantities. A new method has been developed for extracting manganese from formerly useless slag piles. The Komarov committee also perfected methods for the direct smelting of nickel-alloyed iron from ore containing both iron and nickel, and for extracting and combining manganese and iron ores. The committee also helped solve the problem of producing armor plate with existing equipment.

Scientific work should also be given some credit for the high production records recently achieved by the Sverdlovsk blast furnaces and steel mills, where the output has reached nearly double the rate of production at the outbreak of the war.

Scientific exploration has been a boon to the Soviet navy. Before the war, almost all the navy's fuel oil was refined in a single city. At present, the People's Commissariat of Oil Industry is able to draw for its oil upon several refining centers, depending upon the location of the ultimate consumer. The number of plants refining various special lubricants has been doubled during the war. The Soviet aircraft, the Soviet tank and the Soviet warships, which have made such a wonderful showing in the present war of machines, have all had the benefit of the creative ingenuity of Soviet scientists.

The greatest development of all has been in the new Volga valley oil fields. As a worker put it, "in 1939 we got oil here by the spoonful, in 1940 by the pail, and now we get it by the tank car." These Volga Valley Oil Works have become known as the "second Baku," and their potential output is scheduled to equal that of the rich oil fields of the



STEEL is being poured at the Stalin Metallurgical Combinate in Kuznetsk. Many such vital war industries have been moved behind the Ural mountains.

***EXPERIMENTAL FIELD** of the biological station shown in the picture is in Eastern Pamir at an altitude of two miles.*

Urals, and the Emba on the Caspian Coast. In this same region rich new gas and oil deposits have recently been discovered.

A famous American economist, Brooks Emeny, once remarked that of the twenty-two strategic raw materials essential for successful war in case of blockade, the Soviet Union lacked only four: tungsten, tin, antimony and nickel. But that was in 1938. Intensive exploration has since discovered numerous deposits of these valuable minerals and metals in the Urals, Siberia, Northern Kazakhstan, Kuznetsk, Alatau.

Valuable non-metallic minerals were discovered by assiduous prospecting in various regions; mica along the Biryusa River, in the Sayan range, in the Baikal area, and on the Aldau plateau; graphite in the Tunguska Basin—large enough to supply the world for a long time; asbestos; feldspar; magnesite; barium; fluorspar; gypsum; cement materials; quartzites; various clays; marble; jade; roofing slates; sands for the glass industry; phosphorites and new deposits of salt have been discovered in various regions of Siberia.

In no field of endeavor has the contribution of Soviet science been so great, not to say spectacular, as in the field of agriculture. Despite wartime handicaps and temporary loss of large districts to the German invaders, this year's crops covered a greater area than ever before. This was due largely to extensive felling of forests and employing of virgin soil. The acreage of Central Asia under cereals, cotton, and especially sugar beets, has been increased to compensate for loss of sugar beet regions around Kursk. Larger areas were planted to wheat on the steppes of North Caucasus. The Volga region, the Urals, Kazakhstan, Central Asia, Siberia and even the extreme northern regions of the U. S. S. R. are supplying an ever greater part of the food and agricultural raw materials of the country.

The development of agriculture in the northern regions of the U. S. S. R. is generally known as the crowning achievement of Soviet agricultural scientists. In places where even reindeer used to be unable to find sustenance, today's crops are being raised. In some places, agriculture has spread to the very shores of the Arctic Ocean, beyond the 70th parallel. The most northerly farm in the world is in the northern region of U. S. S. R., 200 miles within the Arctic Circle. The Arctic Experimental Station at Naryan Mar succeeded in developing a potato that will not freeze at temperatures below 32 degrees Fahrenheit, and which gives good yields under the severe northern conditions. The same Experimental Station, grown now to an important scientific institution, has developed a variety of wheat adapted to the northern climate. Wheat, barley, oats, rye, flax, hemp, beets, turnips, sugar beets and garden crops—such as carrots, radishes, onions, lettuce and many others—are now growing over hundreds of thousands of acres in the far north.

Since the outbreak of the war the scientists connected with the botanical gardens and laboratories of Moscow have devoted themselves to an increasing degree to the war effort. They are engaged primarily in an effort to discover new vegetable sources of vitamins for the Red Army and the civilian population, on the premise that wild plants often prove richer in vitamins than cultivated plants. They are also working toward a more effective and wider utilization of wild plants for medicinal purposes, and toward the utilization of vegetable growths as raw materials for essential industries.

Before leaving this subject, I would like to call attention to the appeal to his American colleagues of the botanist and academician Boris A. Keller. He requests that American scientists in those fields exchange information with him and his colleagues. Academician Keller is especially interested in any recent research on the active principle of the cola nut and its effective substitutes. Academician Keller informs us that the Moscow Botanical Gardens hopes to devote considerable space to American flora, with the cooperation of American botanists after the war.

In other fields of science, the most outstanding recent contributions may be summarized briefly. They are the development of new methods for (1) production of phosphorus; (2) production of optical glass for special purposes; (3) application of oil of balsam bandages, a method now widely used in Red Army field hospitals; (4) selection and cultivation of new varieties of wheat and barley; (5) valuable studies in radio technique, metallurgy, geochemistry, and mathematics, including new computation tables to be of benefit to the Red Army.

The Soviet Seismologic Institute, which has proceeded with its normal scientific work of recording earthquakes

occurring in all parts of the world, has undertaken special research in air-raid defense methods. The work of this scientific organization, which before the war was directed toward insuring stability of buildings in earthquake zones, has now been applied to the construction of bomb shelters and other essential buildings in the war zones.

The same institute, together with the Academy of Sciences and other research organizations, has undertaken extensive prospecting for strategic war materials and has taken up for solution problems of military engineering, primarily in the field of aviation.

Two chemical institutes devoted to colloid-electrochemistry and physical chemistry, which had to be moved from Moscow deep into the rear, are now working on subjects closely related to war industries.

One of the most striking war inventions is that of the military engineer Kostikov, awarded the title of Hero of the Soviet Union. The Soviet press said that his innovation had already been successfully tested in battle and had won high praise.

The Soviet Academy of Sciences, which has always expressed warmest admiration for American and British scientists, recently elected as honorary members Dr. Gilbert N. Lewis, professor of chemisty at the University of California; Dr. Walter B. Cannon, professor of physiology at Harvard University; and Dr. Ernest O. Lawrence, professor of physics at the University of California.

To the scientists of America, the Soviet Academy makes this appeal: ". . . We call on you American scientists, our dear comrades, to . . . unite all the efforts of your people in the struggle against Hitlerism, to mobilize all your science and technique for the victory of democracy over Hitlerite barbarism. The united technical thought of freedom-loving countries, together with the military valor of our peoples, will assure the defeat of fascism in 1942."

Science News Letter, October 17, 1942

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MEDICINE

Eye Injuries Frequent

Reduction of accidents has not kept pace with development of new treatments. Great strides have been made in preventing blindness.

➤ REDUCTION of blinding eye injuries has not kept pace with the progress in the past 20 years in reducing blindness from disease, Lewis H. Carris, director emeritus of the National Society for the Prevention of Blindness, charged at a meeting of the St. Louis Society for the Blind.

The Leslie Dana Gold Medal for outstanding accomplishments in the movement for protecting eyesight was presented to Mr. Carris at the meeting.

"Industry as a whole has been slow to realize that investment in eye protection pays dividends both in eyes saved and in lowered cost of production," Mr. Carris declared.

As a happy exception and an example of what can be accomplished, he cited the record of the Pullman Company where in 10 years not one worker of the 25,000 employed has lost an eye.

Greatest progress in saving eyesight, apparently, has been made through laws requiring the use of a prophylactic in the eyes of all newborn babies to prevent ophthalmia neonatorum. In 1906-07, Mr. Carris reported, over one-fourth (28.2%) of new pupils enrolled in schools for the blind were blind because of this disease. By 1941-42 the number had dropped to about 7%.

Mr. Carris paid tribute to Dr. Gerhard Domagk, discoverer of the first of the sulfa drugs which are now saving eyesight threatened both by gonorrhea and by trachoma.

Orthoptic training for development of binocular vision and depth perception, so important in these days of aerial warfare, dates back a century or more but has been enormously improved and refined in the last two decades during which other notable achievements in eyesight saving have been made.

The average person identifies orthoptic training with the correction of crossed eyes. It has lately helped some of the young men originally rejected for service in the air forces to meet the visual requirements of this branch of the Service, Mr. Carris stated.

Great strides in preventing blindness due to detached retina were noted. Mr. Carris quoted one authority as saying that improvements in operating technique during the past few years have resulted in one-half the cases being reported cured, though once this condition was practically hopeless.

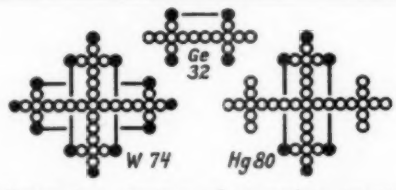
Science News Letter, October 17, 1942

PHYSIOLOGY

New Lens Simplifies Examination of the Eyes

➤ A LENS which changes its focus in the same way that the human eye does, namely, by changing the curvature of its surfaces, has been patented by Robert Graham of Ohio State University. The oculist in testing the eyes, instead of trying one lens after another, may put this single lens before the eye. Turning a little knob changes the focus, and a needle on a dial indicates the power. Two crossed cylindrical lenses of very thin glass (0.0028 inch) with liquid between them are used. Squeezing these together along the edges changes the curvature.

Science News Letter, October 17, 1942



Vortex-atom structures of germanium, tungsten, and mercury. Copyright 1942 by Carl F. Krafft. These and many other diagrams are presented with apologies to the physics authorities of today who still tell us that the vortex-atom is an exploded fallacy, that the atom is known to have a nucleus and that the atom cannot be represented by picture or diagram. Free upon request.

C. F. Krafft, 1322 Amherst Ave., Richmond, Va.

PHARMACY

New Totaquine Standards

Anti-malarial obtained from "Jesuit's Bark" may contain less quinine; ceiling also imposed. Total amount of active ingredients remains the same. Found effective.

➤ NEW STANDARDS will soon be officially announced for the anti-malarial, totaquine, it is reported by Dr. E. Fullerton Cook, chairman of the committee of revision of the U. S. Pharmacopeia.

The medicine is a mixture of substances, including quinine, obtained from "Jesuit's Bark." This mixture has the same action against malaria as quinine, but has been little used in this country.

Lowering the quinine content to 7%, results in fuller use of South America barks which analyses show average only 1% quinine. This does not include about a fourth of the bark samples which contained practically no quinine. They contain the other anti-malaria substances, however, which can be just as effectively used as quinine, most physicians believe.

The former standard required 10% quinine or more. Now a ceiling of 12% will also be imposed, Dr. Cook announces.

This presumably was adopted to insure uniform results in treatment and to prevent conflicting therapeutic claims and price differences. Authorities feel that these would be unjustified merely on the basis of one preparation containing more quinine than another.

Another requirement that at least a fourth of the product be cinchonidine and cinchonine will be completely dropped. The lower limit of 70% total crystallizable alkaloids will have a ceiling of 80% in the new monograph.

The new standards will be maintained, Dr. Cook explains, for at least the "duration" while the maximum use of anti-malarial supplies is necessary due to exposure of our troops to the fever and cessation of our usual imports from the Far East.

Totaquine is equal to quinine in anti-malarial efficiency. That is the concensus of opinion expressed by experts on tropical diseases at a recent conference called by the National Research Council in Washington.

Science News Letter, October 17, 1942

● RADIO

Saturday, October 24, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Reginald Atwater, executive secretary of the American Public Health Association, will give some of the highlights of scientific research that will be presented at the meeting of the Public Health Association in St. Louis October 27-30.

Tuesday, October 20, 7:30 p.m., EWT

Science Clubs of America programs over WRUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

One in a series of regular periods, over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.

Monday, October 19, 9:15 a.m., EWT

Repeated at 12:30 p.m., PWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service and Science Clubs of America.

"Building Machinery" will be the subject of the program.

NUTRITION

Food Second To Nothing

➤ "IN THE business of fighting a war, food is not second to any other item," Colonel Paul Logan, assistant chief of the Subsistence Division, Quartermaster Corps, said, speaking to a hundred representatives of the dehydration industry attending the two weeks school conducted by the Department of Agriculture at the Western Regional Laboratory in Albany, Calif.

"It isn't possible to overemphasize to you and your companies their importance in this war," Col. Logan declared.

"Today in this war the most precious thing in all the world is forty cubic feet of space commonly known as a ship's ton. With unlimited tonnage we would have long since had more supplies and a greater fighting force overseas. If we can use each one of the cubic feet to best advantage we have contributed tremendously toward the war effort."

Using dehydrated foods is one way of gaining this advantage. Great Britain, for example, was purchasing canned potatoes. A ship's ton of canned boiled potatoes weighs 920 pounds. The same ship's ton of dehydrated potatoes reconstituted weighs 3,980 pounds.

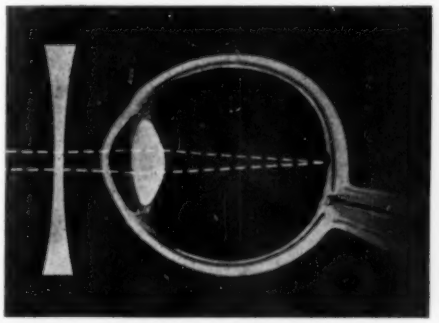
To prevent possible loss through inferior quality the government conducts rigid inspections of plants and products. With the help and suggestions of people all over the country, it has established precise specifications. Rejected material is to be disposed of under the supervision of an inspector and any vendor offering rejected material can be prosecuted for fraud, Col. Logan pointed out.

The army, being one of the largest buyers in the world today, deals directly with the producers and gives out contracts, known as "Letters of Intent." The Joint Dehydration Committee at Washington passes upon the applications of every one going into the business and gives "approval of plants as projects."

"I am very much interested in seeing this industry get established this year," Colonel Logan said. "Every pound of food that America can produce is going to be needed. We need it and the world needs it."

Science News Letter, October 17, 1942

THE EYES AND THEIR CARE



"Myopia may be corrected by proper concave lenses."—from the instructional sound film **The Eyes and Their Care.**

Write for information on one hundred eighty other films and plans for financing local film libraries.

Erpi Classroom Films Inc.

1841 Broadway, New York, N. Y.

OLIN HALL—Where Cornell University students will train for war-important chemical engineering jobs.

CHEMICAL ENGINEERING

Chemical Hall Built

Training for war-time chemical operations provided. Traveling crane and three-story test unit provided for engineers. Planned for creative practical work.

➤ WAR-TIME NEEDS of training in large-scale chemical operations will be met by the new Olin Hall of Chemical Engineering at Cornell University. One wing of the building contains a three-story "Unit Operations Laboratory," where students may design, construct, and test manufacturing units large enough to give an accurate idea of the factors involved in full-scale production. Operating platforms are provided at three different levels, but otherwise the three-story space is unobstructed. The laboratory is served by a traveling crane.

Few classrooms are provided, but there are many small laboratories where students in groups of two or three may work at special problems. It is the theory of Dr. Fred H. Rhodes, professor of industrial chemistry and director of the school of chemical engineering, tested for the past 22 years at Cornell, that this method develops to a maximum degree the responsibility and initiative required in creative practical work.

The building, the largest on the campus, will house 450 undergraduates and a proportionate number of graduate students. It is the gift of Franklin W. Olin, Cornell graduate and university trustee, President of the Western Cartridge Company of Alton, Ill. The laboratory will be opened to students for the first time this fall.

Science News Letter, October 17, 1942

For some unexplained reason, thousands upon thousands of *Japanese beetles* have been swarming over the great power dam at Conowingo, between Baltimore and Philadelphia.

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Of SCIENCE NEWS LETTER published weekly at Washington, D. C., for Oct. 3, 1942.

Washington
District of Columbia
ss.

Before me, a Notary Public in and for the District of Columbia aforesaid, personally appeared Alvin C. Stewart, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the SCIENCE NEWS LETTER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Editor, Watson Davis, 1719 N St., N. W., Washington, D. C.

Business Manager, Alvin C. Stewart, 1719 N St., N. W., Washington, D. C.

2. That the owner is:

Science Service, Inc., 1719 N St., N. W., Washington, D. C., a non-profit corporation without stock, operating as the Institution for the Popularization of Science.

3. That the known bondholders, mortgagees, and other security holders owning or holding mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Alvin C. Stewart,
Business Manager.

Sworn to and subscribed before me this 3rd day of October, 1942.

[SEAL]

Kenneth O. Hulse

(My commission expires Jan. 14, 1947)

• New Machines and Gadgets •

⚙ *QUICK-DRYING paints and lacquers have enormously reduced the time that tanks and planes must be held up while the paint is drying. One of the newest of these is a short-bake finish of the urea-formaldehyde resin type, developed by the same laboratories that produced the nitrocellulose lacquer used on automobiles, and the glistening white resin enamel used on refrigerators. A form of the latter has been developed as a camouflage finish for airplanes.*

Science News Letter, October 17, 1942

⚙ *AN IMPROVED centrifuge for blood plasma, which separates the plasma from the blood cells quickly and more effectively than previous machines, is the war contribution of one instrument maker. The machine swings four bottles up to speeds of 2500 revolutions per minute developing a centrifugal force 1700 times gravity. A feature is that the head in which the bottles swing revolves with them so that the bottles are always in dead air. This reduces friction and undesirable heating of the blood.*

Science News Letter, October 17, 1942

⚙ *FLASHLIGHT POWDER, which oldtime photographers used and which made such a messy smoke, is back again, but this time inside a bulb. Powdered zirconium, aluminum and other flash-making ingredients are aggregated into beads or pellets and mounted on wires that carry the igniting charge. This kind of flash-lamp, the inventor states, is easier and cheaper to build than the present foil or filament-loaded type. The device has been patented.*

Science News Letter, October 17, 1942

⚙ *TEETERING TABLES may give considerable annoyance. A patent has recently been granted on a glass glider which screws into the furniture leg, so that if one leg is short, the glider can simply be screwed out a bit.*

Science News Letter, October 17, 1942

⚙ *AN EMERGENCY blackout flashlight you can put together yourself is shown in the picture. No tools are required but scissors and your fingers. The lamp is held in place just over the central pole of the battery by an ordinary paper clip. The long end of this clip is thrust down between the zinc of the battery and the outer cardboard shell. The other end is stretched out and bent*

around the lamp, following the threads. To light the lamp just press down on the paper-clip spring. To keep the light permanently on, screw the lamp down. The shade is cut out of stiff paper or thin cardboard and held on with a rubber band around the battery. The light was devised in preparation for a blackout when complete flash-lamps could not be obtained.

Science News Letter, October 17, 1942

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 126.*

PUBLIC HEALTH

Rabbit Trappers Should Guard Against Tularemia

➤ TRAPPERS out for the increased take of rabbits urged by the WPB and the U. S. Fish and Wildlife Service to relieve the shortage in pelts used in making felt hats, should remember the danger of getting tularemia from the animals and protect themselves from it.

Because of the rubber shortage the usual advice to wear rubber gloves while skinning or dressing wild rabbits is impractical this season. The rubber gloves have been advised in the past because the germs of tularemia, or rabbit fever as it is also called, can pass through healthy skin and do not need a cut or scratch or bite to use as a door into the body. Neither cotton nor leather gloves can be relied on to bar the germs.

Best alternatives to the rubber glove protection that can be advised are: 1. Don't handle rabbits if you have any cuts, scratches or breaks in the skin of your hands; 2. Wash hands thoroughly with plenty of soap and water after handling rabbits and use a disinfectant if the hands, face or arms become soiled with blood or other infected material; 3. Keep your hands away from your face and eyes while working over the rabbits, as the infection is sometimes acquired by rubbing the eyes with soiled fingers.

Rabbits are not all infected with the tularemia germs, of course. Sick rabbits, however, should be viewed with suspicion, though trappers are less likely to notice this than the hunter who sees whether the animal is lively and runs well.

Rabbits in the Central States are more likely to be infected with tularemia than those in New England, the West or the South, judging from reports of the prevalence of the disease in humans.

Housewives and cooks, who may be using more rabbit meat because of the shortage of other kinds of meat this year, should know that the germs of tularemia are killed by thorough cooking. The germs remain alive and virulent, however, in the red juices of partly cooked game.

Peculiar whitish spots on the spleen and liver of rabbit carcasses should make one suspect tularemia. Such carcasses, the U. S. Public Health Service warns, should be discarded and buried or burned.

Science News Letter, October 17, 1942

Two *pilot training* schools will soon be established in Mexico, similar to the 600 now operated in the United States by the Civil Aeronautics Administration.

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First Glances at New Books

➤ EVERYONE SHOULD know something of the nature of the physical world in which he lives. This knowledge is given in MAN AND HIS PHYSICAL WORLD, by Dwight E. Gray (*Van Nostrand Company*, $3.75). It is not a book for casual reading but for serious study by those who really want to know. It was prepared for college students who are not majoring in a scientific field. It contains no mathematics.

Science News Letter, October 17, 1942

➤ APPROPRIATELY starting with vectors, since the book is intended for students of engineering and the physical sciences, A FIRST COURSE IN MATHEMATICS, by Edward Baker (*Van Nostrand*, $3), leads the student by easy stages from less difficult to more difficult subjects, ending with a short chapter on the underlying principles of the calculus.

Science News Letter, October 17, 1942

➤ TO HELP the young man choose that branch of engineering that best suits his inclinations and abilities, is the object of YOUR CAREER IN ENGINEERING, by Norman V. Carlisle (*Dutton*, $2.50). This is accomplished by showing both by text and photographs the sort of work he will encounter in each field.

Science News Letter, October 17, 1942

➤ TO HELP win the war on the food front, the U. S. Bureau of Home Economics has prepared two sets of 14 x 20 inch colorful, pictorial charts that would make good wall decorations for kitchens and classrooms. FIGHT FOOD WASTE IN THE HOME tells how to keep food safe from spoilage. GET THE GOOD FROM YOUR FOOD tells ways to stop waste in all steps of food prepartion from peeling to dishing-up. The charts are sold in sets only. (*Govt. Print. Off.*, 25c per set of 10).

Science News Letter, October 17, 1942

➤ THE MANNER in which nebulae have acquired their spiral arms is plausibly accounted for on the basis of classical dynamics in PRINCIPLES OF STELLAR DYNAMICS, by S. Chandrasekhar of Yerkes Observatory (*Univ. of Chicago Press*, $5.). Other major problems of modern astronomy are also illuminatingly discussed. The book is, in fact, an excellent introduction to the whole field of stellar dynamics.

Science News Letter, October 17, 1942

➤ SINCE 1885 when Ebbinghaus published his pioneer work on *Memory*, many psychological experiments have been conducted and much has been learned about how men learn and why they forget. This wealth of knowledge is summarized and interpreted for college students in THE PSYCHOLOGY OF HUMAN LEARNING: AN INTRODUCTION by John A. McGeoch, (*Longmans, Green*, $4.) who was a widely known authority in this field, located at the University of Iowa. It is a posthumous volume, having been just completed and sent to the publishers before his death.

Science News Letter, October 17, 1942

➤ AN EYE-WITNESS account of twenty years of fascinating Egyptian archaeological discoveries is found in EXCAVATIONS AT DEIR EL BAHRI: 1911-1931, by H. E. Winlock (*Macmillan*, $5). Mr. Winlock was Director of the Egyptian Expedition of the Metropolitan Museum.

Science News Letter, October 17, 1942

• Books Just Off the Press •

THE CRUX OF CHRONOLOGY—Frank Herman Meyer—*Humphries*, 599 p., $3.

DEMOCRATIC IDEALS AND REALITY—Halford J. Mackinder—*Holt*, 219 p., illus., $1.90. "A study in the politics of reconstruction."

GASOLINE, PAST, PRESENT AND FUTURE—Graham Edgar—Amer. Soc. for Testing Materials, 14 p., 35c. The Seventeenth Edgar Marburg Lecture presented before the 45th annual meeting of the A. S. T. M.

GEOMORPHOLOGY — O. D. von Engeln — *Macmillan*, 655 p., illus., $4.50.

THE GREAT OFFENSIVE — Max Werner — *Viking*, 360 p., $3. A military history of the war since the time the U. S. S. R. and the United States entered the conflict.

HURRICANES (2nd ed.)—Ivan Ray Tannehill—*Princeton Univ. Press*, 265 p., illus., $3.75.

INTERNATIONAL AIR TRANSPORT AND NATIONAL POLICY—Oliver James Lissitzyn—*Council on Foreign Relations*, 478 p., $5. Studies in American Foreign Relations, no. 3.

INTRODUCTION TO NAVAL ARCHITECTURE John P. Comstock—*Simmons-Boardman*, 209 p., charts, $4. A text suitable for high school graduates who have not had college mathematics.

LEONARDO, MASTER OF THE RENAISSANCE — Elizabeth Hubbard Lansing — *Crowell*, 237 p., illus., $2.75. A book for young people, with nice illustrations. Emphasis is placed on Da Vinci's scientific experiments.

LIVES AROUND US—Alan Devoe—*Creative Age*, 221 p., illus., $2. Written by an outstanding naturalist, and illustrated with woodcuts by Frank Utpatel, this book would make an ideal gift, or library addition.

MAP READING AND AVIGATION — Richard M. Field and Harlan T. Stetson — *Van Nostrand*, 129 p., illus., $2.50. For beginning students in aviation. Beautifully illustrated in spite of security restrictions.

A MATHEMATICS REFRESHER — A. Hooper —*Holt*, 356 p., tables, charts, diagr., $1.90. American edition.

MEDICAL PARASITOLOGY—James T. Culbertson—*Columbia Univ. Press*, 285 p., illus., $4.25. Technical book for doctors and medical students, especially interesting now that so many American doctors will be serving with the Army in tropical regions where the parasites of malaria, sleeping sickness and the like are prevalent.

MIND: PERCEPTION AND THOUGHT IN THEIR CONSTRUCTIVE ASPECTS — Paul Schilder—*Columbia Univ. Press*, 432 p., $5.

NEAR HORIZONS — Edwin Way Teale — *Dodd, Mead*, 319 p., illus., $3.75. "The story of an insect garden." Well illustrated with action photographs and close-ups.

QUESTIONS AND ANSWERS CONCERNING THE JEWS — *Anti-Defamation League of B'nai B'rith*, 124 p., $1.

A REVISION OF THE NORTH AMERICAN SPECIES OF BUPRESTID BEETLES BELONGING TO THE TRIBE CHRYSOBOTHRINI — W. S. Fisher—*Gov't Print. Office*, 275 p., illus., 30c.

SARGENTIA . . . FIJIAN PLANT STUDIES — A. C. Smith—*Arnold Arboretum of Harvard Univ.*, 148 p., $2.50.

SENSATION AND PERCEPTION IN THE HISTORY OF EXPERIMENTAL PSYCHOLOGY—Edwin G. Boring—*Appleton-Century*, 644 p., illus., $5.

SHELLS AND SHOOTING — Willy Ley — *Viking*, 223 p., $2. The story of the history of guns and gunpowder beginning with the 14th century.

THE SKELETO-MUSCULAR MECHANISMS OF THE HONEY BEE — R. E. Snodgrass — *Smithsonian*, 120 p., diagr., 55c.

THE SNOW AND ICE ALGAE OF ALASKA—Erzsébet Kol—*Smithsonian*, 36 p., illus., 45c.

THE STEAM LOCOMOTIVE—Ralph P. Johnson—*Simmons-Boardman*, 502 p., illus., $3.50.

A TEXTBOOK OF GENERAL BOTANY (4th ed.)—Gilbert M. Smith—*Macmillan*, 668 p., illus., $4.

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